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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/519,952	07/15/2005	Jac-Wan Oh	264046US3PCT	7368
22850	7590	02/07/2008		
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
			EXAMINER	
			ZHENG, LOIS L	
		ART UNIT	PAPER NUMBER	
		1793		
		NOTIFICATION DATE	DELIVERY MODE	
		02/07/2008	ELECTRONIC	

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/519,952	<b>Applicant(s)</b> OH, JAE-WAN	
	<b>Examiner</b> LOIS ZHENG	<b>Art Unit</b> 1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>5/23/05, 1/13/06</u> . | 6) <input type="checkbox"/> Other: _____  |

**/Roy King/**

**Supervisory Patent Examiner, Art Unit 1742** **DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election without traverse of invention group I, claims 1-15, in the reply filed on 16 November 2007 is acknowledged.
2. Claims 16-18 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention group II, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 16 November 2007.

***Means-Plus-Function Language***

3. Instant claims 1-4, 7 and 9 contain the flowing terms written in means-plus-function format, and have been interpreted as follows:

"reaction control means" (claims 1-4, 7 and 9) is in proper means-plus-function format and is defined in claims 2-4 and on page 6 between lines 5 and 20 of the specification.

***Specification***

4. The disclosure is objected to because of the following informalities:

Numeral "10" is used to designate both a reactant feeder and an inlet as show in lines 17-18 on page 6 of the specification.

Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

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The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claim 10 recites the limitation "the groove of said screw" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 13 recites the limitation "two adjacent groove" in line 2. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-2, 4, 7, 9-10 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by GB 2,324,781 A (GB'781).

GB'781 teaches a powder molding apparatus comprising the claimed barrel(Fig. #12) with an inlet(Fig. #11a) equipped with a feed mixture(Fig. #11) at one end of the barrel and an outlet at the other end of the barrel(Fig. #13), a screw(Fig. #27) rotationally mounted in the barrel to move the feed material from the inlet to the outlet, a driving motor(Fig. #28) for rotating the screw and a plurality of heating units(Fig. #30) along the length of the barrel. For the purpose of temperature control, GB'781 further teaches that temperature measurements from a plurality of temperature sensors in the feed mixer and along the length of the barrel(Fig. #31, page 5 last paragraph, page 6 last paragraph) are sent to a controller (Fig. #20). Level measurements from a level sensor(Fig. #39) in the powder reservoir (Fig. #14) at the product end of the barrel as

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taught by GB'781 are also forwarded to the controller in order to control the rotational speed of the screw(col. 7 last two paragraphs).

Regarding claims 1-2, 9 and 14, the powder molding apparatus of GB'781 reads on the claimed powder fabricating apparatus.

Regarding claim 4, GB'781 further teaches that feed raw material includes metal powder that contains a lubricant. Therefore, the lubricant as taught by GB'781 reads on the claimed concentration control device.

Regarding claim 7, GB'781 further teaches that the heating units can be separately controlled in their zonal positions based on the heat sensors along the length of the barrel(page 6 last paragraph), which meets the limitation of a plurality of zones separately controlled by the reaction control means.

Regarding claim 10, the implied threads on the screw of GB'781 reads on the claimed projections on the groove surfaces based on the broadest reasonable interpretation.

Therefore, GB'781 anticipates the instant claims 1-2, 4, 7, 9-10 and 14.

9. Claims 1-2, 4-8 and 10-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Shutov et al. US 5,415,354 (Shutov).

Shutov teaches a two-screw polymer pulverization device comprising the claimed barrel (Fig. 1 # 13) having an inlet connected to a feed hopper(Fig. 1 # 11), an outlet at the opposite end of the barrel, wherein the barrel is separated into four zones, each controlled by separate heating or cooling means(Fig. 1 # 12 and 15), and two screws (Fig. 2 # 14) positioned in parallel along the length of barrel(Fig. 1 # 14). Shutov further

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teaches that the screws are driven by an electric motor and the rotational speed and the temperatures of four zones of the barrel are separately controlled within certain ranges(col. 7 lines 49-66), which implies the claimed controller and the claimed temperature control device(i.e. reaction control means).

Regarding claims 1-2, 7 and 11, the two-screw pulverization device as taught by Shutov meets the structure limitations of the instant claims.

Regarding claims 4 and 14, Shutov further teaches that a mixture of polymer materials can be used as the feed(col. 5 lines 53-58). Therefore, the mixture of polymer material as taught by Shutov which read on the claimed concentration control device. The feed hopper as taught by Shutov reads on the claimed reactant feeder/mixer.

Regarding claims 5-6, Shutov further teaches any non-reactive gas such as air is introduced into the fourth zone of the barrel in order to fluidize the powder to prevent agglomeration and to cool the powder(col. 6 lines 55-65).

Regarding claim 8, the separately controlled four zones on the barrel of Shutov are capable of functioning as the claimed nuclei generating, reaction buffering, major reaction and grain ripening zones as claimed based on the manipulation of the heating and cooling means in the four zones of the barrel in the apparatus of Shutov.

Regarding claim 10, the implied threads on the screws of Shutov reads on the claimed projections on the groove surfaces based on the broadest reasonable interpretation.

Regarding claim 12, Shutov further teaches that the screws are conical in shape(i.e. diameter graduate decrease from the inlet of the barrel to the outlet of the

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barrel)(Fig. 1) in order to provide additional normal and shear stresses to the material sufficient to form fine powder(col. 6 lines 35-38).

Regarding claim 13, Shutov further teaches that the distance between the screw flights in the fourth zone helps to prevent agglomeration of fine powders(col. 4 lines 29-32).

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB'781.

The teachings of GB'781 are discussed in paragraph 8 above.

Regarding claim 3, since GB'781 is silent with respect to the types of the heating units used along the length of the barrel, one of ordinary skill in the art would have found it obvious to have incorporated any well know heating means in the art, for example electron beam heating means(i.e. electron supply device), to heat the zones of the barrel in the apparatus of GB'781 with expected success.

Regarding claim 15, even though GB'781 does not explicitly teach the claimed condenser containing collector connected to the outlet of the barrel, one of ordinary skill in the art would have found it obvious to have incorporated an condenser containing

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collector in communication with the outlet of the barrel in the apparatus of GB'781 in order to produce a cooled final metal product.

12. Claims 5-6 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB'781, and further in view of Enkolopow et al. US 4,607,797(Enkolopow).

The teachings of GB'781 are discussed in paragraph 8 above. However, GB'781 does not explicitly teach the claimed atmosphere providing device.

Enkolopow teaches a polymer pulverizing apparatus comprising a barrel(Fig. 1 #8), a feed hopper(Fig. 1 # 5), a screw member(Fig. 1 # 6), a plurality of heating and cooling conduits(Fig. 1 # 10 and 13) along the length of the barrel to control temperature within different zones along the length of the barrel.

Regarding claims 5-6, Enkolopow further teaches that a degassing conduit is connected to the barrel to produce a vacuum to remove moisture and residual monomers(col. 5 lines 56-64). Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the degassing conduit as taught by Enkolopow into the apparatus of GB'781 in order to remove moisture and residual monomers as taught by Enkolopow.

Regarding claim 11, Enkolopow further teaches that two screw members can be used in the barrel wherein the two screws mesh with one another to produce a self-cleaning effect(col. 4 lines 42-47). Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the two screw configuration as taught by Enkolopow into the apparatus of GB'781 in order to successfully conveying the powder material at the same time creating a self-cleaning effect as taught by Enkolopow.



13. Claims 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over GB'781, and further in view of Shutov et al. US 5,415,354(Shutov).

The teachings of GB'781 are discussed in paragraph 8 above. However, GB'781 does not explicitly teach the claimed changes in groove diameter and inter-groove distance.

Shutov teaches a two-screw polymer pulverization device comprising a barrel (Fig. 1 # 13) having an inlet connected to a feed hopper(Fig. 1 # 11), an outlet at the opposite end of the barrel, wherein the barrel is separated into four zones, each controlled by separate heating or cooling means(Fig. 1 # 12 and 15), and two screws (Fig. 2 # 14) positioned in parallel along the length of barrel(Fig. 1 # 14).

Regarding claim 12, Shutov further teaches that the screws are conical in shape(i.e. diameter graduate decrease from the inlet of the barrel to the outlet of the barrel)(Fig. 1) in order to provide additional normal and shear stresses to the material sufficient to form fine powder(col. 6 lines 35-38). Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the conical shaped screws as taught by Shutov into the powder moulding apparatus of GB'781 in order to form fine powder as taught by Shutov.

Regarding claim 13, Shutov further teaches that the distance between the screw flights in the fourth zone helps to prevent agglomeration of fine powders(col. 4 lines 29-32). Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the larger spacing between screw flights as taught by Shutov into the end

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zone of the powder molding apparatus of GB'781 in order to prevent agglomeration of the fine powders as taught by Shutov.

14. Claims 3 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shutov.

The teachings of Shutov are discussed in paragraph 9 above.

Regarding claim 3, Shutov further teaches that the heating means used in the first and second zones can be any suitable heating means known to the art(col. 6 lines 3-11). Therefore, one of ordinary skill in the art would have found it obvious to have incorporated an electron beam heating device(i.e. electron supply device) to heat the first and second zones of the barrel apparatus of Shutov with expected success since electron beam heating is a well known heating means in the art.

Regarding claim 15, even though Shutov does not explicitly teach the claimed condenser containing collector connected to the outlet of the barrel, one of ordinary skill in the art would have found it obvious to have incorporated an condenser containing collector in communication with the outlet of the barrel in the apparatus of Shutov in order to produce cooled final pulverized polymer powders.

15. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shutov, and further in view of GB'781.

The teachings of Shutov are discussed in paragraph 9 above. However, Shutov does not explicitly teach the claimed plurality of sensors and the controller performs control of the reaction control means based on the measurements from the sensors.

The teachings of GB'781 are discussed in paragraph 8 above.


Therefore, it would have been obvious to one of ordinary skill in the art to have incorporated the temperature sensors and the feedback controller as taught by GB'781 into the apparatus of Shutov in order to precisely control the temperature of each zones on the barrel as taught by GB'781.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LOIS ZHENG whose telephone number is (571)272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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